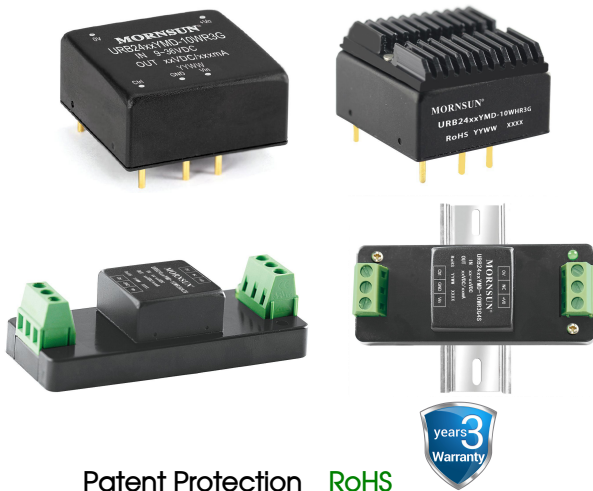


10W isolated DC-DC converter in DIP package
Ultra-wide input and regulated single output



Patent Protection RoHS

FEATURES

- Ultra-wide 4:1 input voltage range
- High efficiency up to 88%
- No-load power consumption as low as 0.12W
- I/O isolation test voltage 1.5k VDC
- Input under-voltage protection, output short-circuit, over-current, over-voltage protection
- Operating ambient temperature range: -40°C to +85°C
- Input reverse polarity protection available with chassis(A2S) or 35mm DIN-rail mounting(A4S) version
- Industry standard pin-out

URB24_YMD-10WR3G series are isolated 10W DC-DC converter products feature an ultra-wide with 4:1 input voltage with efficiencies of up to 88%, 1500VDC input to output isolation, operating ambient temperature range of -40°C to +85°C, input under-voltage protection, output short-circuit, over-current, over-voltage protection. Optional packages are offered for chassis or DIN-rail mounting (A2S, A4S). They are widely used in applications such as industrial control, electric power, instruments, communication and railway applications.

Selection Guide

Certification	Part No. ①	Input Voltage (VDC)		Output		Full Load Efficiency ④ (%)Min./Typ.	Capacitive Load (μF)Max.
		Nominal ② (Range)	Max. ③	Voltage(VDC)	Current (mA) Max./Min.		
—	URB2405YMD-10WR3G	24 (9-36)	40	5	2000/0	80/82	2200
	URB2412YMD-10WR3G			12	833/0	83/85	680
	URB2415YMD-10WR3G			15	666/0	84/86	470
	URB2424YMD-10WR3G			24	416/0	86/88	330
	URB2428YMD-10WR3G*			28	357/0	85/87	100

Notes:

- ① Product model mark “*”, mean use “H” suffix for heat sink mounting, “A2S” suffix for chassis mounting and “A4S” suffix for DIN-Rail mounting;
- ② The A2S and A4S Model’s start-up and minimum input voltages are increased by 1VDC due to the input reverse polarity protection circuit;
- ③ Exceeding the maximum input voltage may cause permanent damage;
- ④ Efficiency is measured at nominal input voltage and rated output load; efficiencies for A2S and A4S Model’s is decreased by 2% due to the input reverse polarity protection circuit.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	24VDC nominal input series	—	502/5	521/15	mA
Surge Voltage (1sec. max.)		-0.7	—	50	VDC
Start-up Voltage		—	—	9	
Input Under-voltage Protection		5.5	7.0	—	
Start-up Time	Nominal input voltage & constant resistance load	—	10	—	ms
Input Filter		Pi filter			
Hot Plug		Unavailable			
Ctrl *	Module on	Ctrl pin open or pulled high (3.5-12VDC)			
	Module off	Ctrl pin pulled low to GND (0-1.2VDC)			
	Input current when off	—	6	10	mA

Note: *The Ctrl pin voltage is referenced to input GND.

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Voltage Accuracy	5%-100% load	--	±1	±3	%
Linear Regulation	Input voltage variation from low to high at full load	--	±0.2	±0.5	
Load Regulation ^①	5%-100% load	--	±0.5	±1	
Transient Recovery Time	25% load step change, nominal input voltage		300	500	μs
Transient Response Deviation	25% load step change, input voltage range	5V output	±3	±8	%
		Others	±3	±5	
Temperature Coefficient	Full load	--	--	±0.03	%/°C
Ripple & Noise ^②	20MHz bandwidth, 5%-100% load, input voltage range	--	50	100	mVp-p
Over-voltage Protection	Input voltage range	110	140	160	%Vo
Over-current Protection		110	140	190	%Io
Short-circuit Protection		Hiccup, continuous, self-recovery			

Note:
^①Load regulation for 0%-100% load is ±3%;
^②Under 0% -5% load conditions, ripple & noise does not exceed 5%Vo. The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.	1500	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC	100	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	1000	--	pF
Operating Temperature	See Fig. 1	-40	--	+85	°C
Storage Temperature		-55	--	+125	
Storage Humidity	Non-condensing	5	--	95	%RH
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	300	°C
Vibration		10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency *	PWM mode	--	330	--	kHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	k hours

Note: *Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

Mechanical Specifications

Case Material	Aluminum alloy		
Dimensions	Horizontal package (without heat sink)		25.40 x 25.40 x 11.70 mm
	Horizontal package (with heat sink)		25.40 x 25.40 x 16.20 mm
	A2S chassis mounting		76.00 x 31.50 x 21.20 mm
	A4S DIN-rail mounting		76.00 x 31.50 x 25.80 mm
Weight	without heat sink	Horizontal package/A2S chassis mounting/A4S DIN-Rail mounting	12.5g/36.0g/56.0g (Typ.)
	with heat sink	Horizontal package	17g (Typ.)
Cooling method	Free air convection		

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B (see Fig.3-② for recommended circuit)		
	RE	CISPR32/EN55032	CLASS B (see Fig.3-② for recommended circuit)		
Immunity	ESD	IEC/EN61000-4-2	Contact ±4kV	perf. Criteria B	
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A	
	EFT	IEC/EN61000-4-4	±2kV (see Fig.3-① for recommended circuit)	perf. Criteria B	
	Surge	IEC/EN61000-4-5	line to line ±2kV (see Fig.3-① for recommended circuit)	perf. Criteria B	
	CS	IEC/EN61000-4-6	3 V _{r.m.s}	perf. Criteria A	

Typical Characteristic Curves

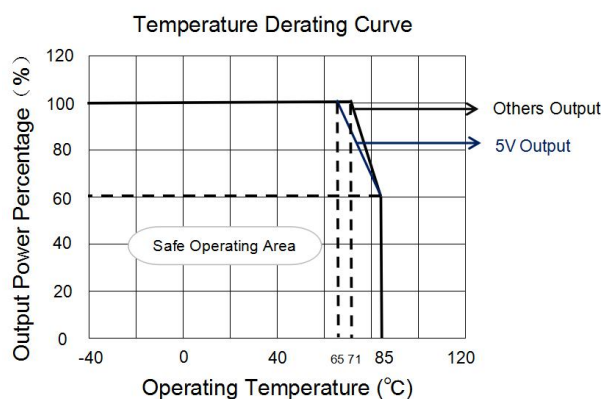
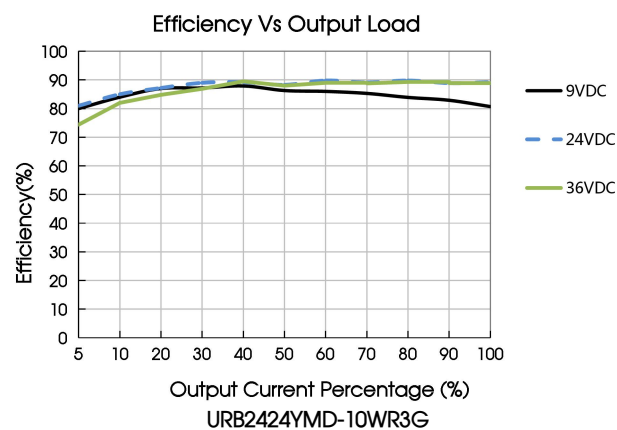
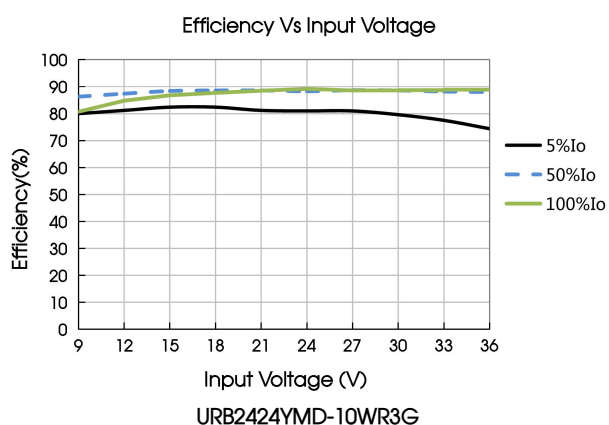
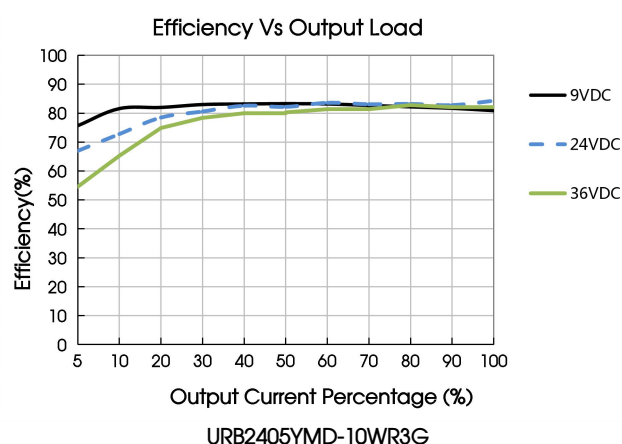
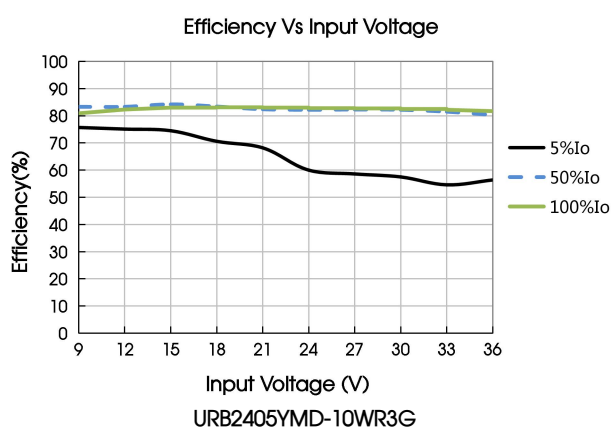


Fig. 1



Design Reference

1. Typical application

All the DC/DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2.

Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values C_{in} and C_{out} and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.

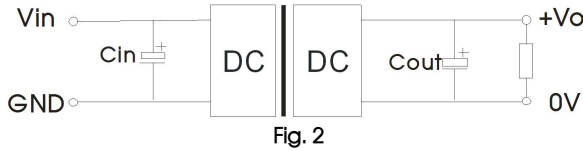


Fig. 2

Vin(VDC)	Vout(VDC)	Cin	Cout
24	5	100μF/50V	10μF/16V
	12/15		10μF/25V
	24/28		10μF/50V

2. EMC compliance circuit

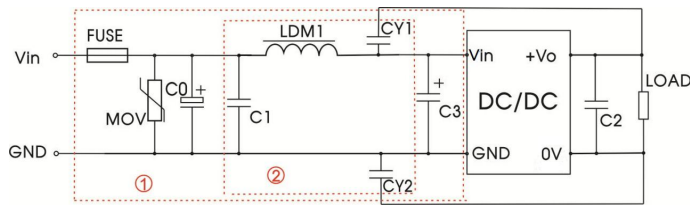


Fig. 3

Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

Parameter description:

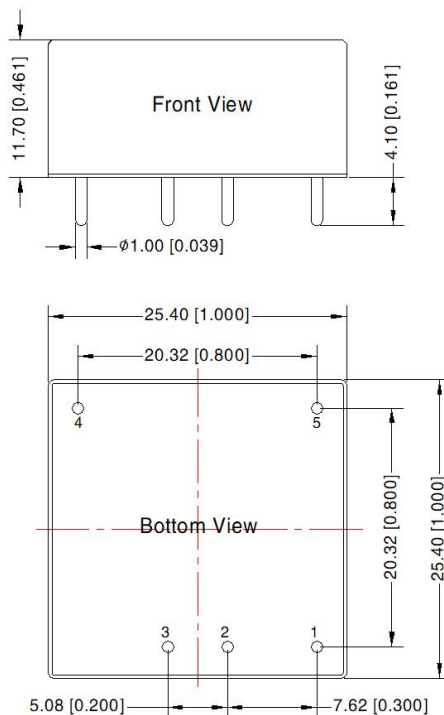
Model	Vin: 24VDC
FUSE	Choose according to actual input current
MOV	S20K30
C0, C3	330μF/50V
C1	1μF/50V
C2	Refer to the Cout in Fig.2
LDM1	4.7μH
CY1, CY2	1nF/2kV

3. The products do not support parallel connection of their output

4. For additional information please refer to DC-DC converter application notes on

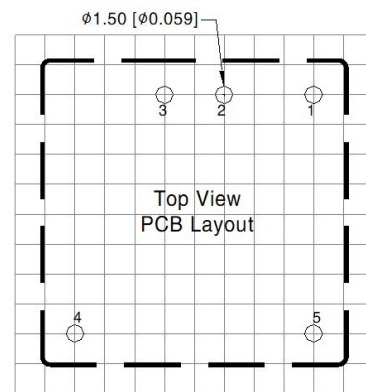
www.mornsun-power.com

Horizontal Package (without heat sink) Dimensions and Recommended Layout



Note:
Unit: mm[inch]
Pin diameter tolerances: $\pm 0.10 [\pm 0.004]$
General tolerances: $\pm 0.50 [\pm 0.020]$

THIRD ANGLE PROJECTION

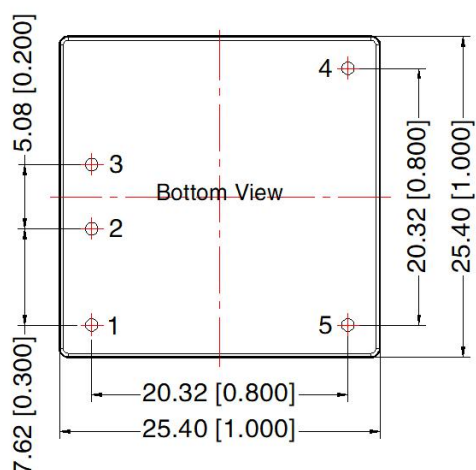
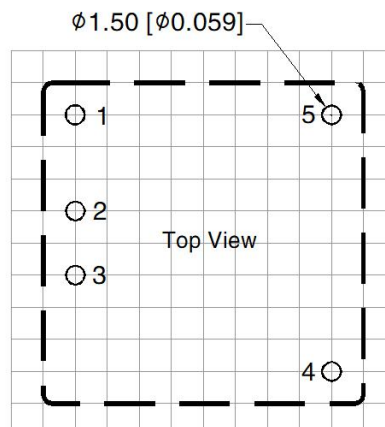
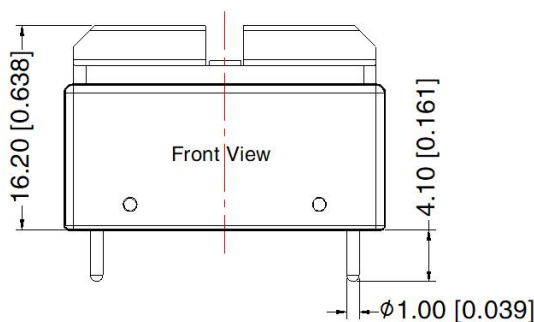


Note: G

Pin-Out	
Pin	Mark
1	Ctrl
2	GND
3	Vin
4	+Vo
5	0V

Horizontal Package (with heat sink) Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



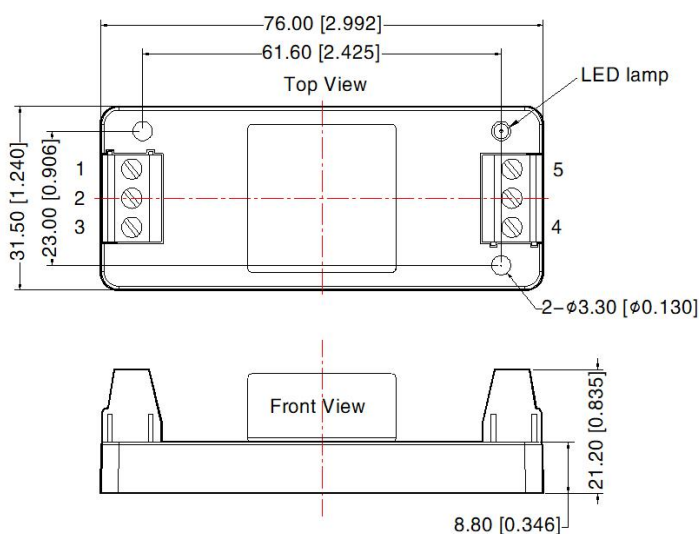
Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Mark
1	Ctrl
2	GND
3	Vin
4	+Vo
5	0V

Note:
Unit :mm[inch]
Pin diameter tolerances : $\pm 0.10 [\pm 0.004]$
General tolerances : $\pm 0.50 [\pm 0.020]$

URB24_YMD-10WR3GA2S Dimensions

THIRD ANGLE PROJECTION

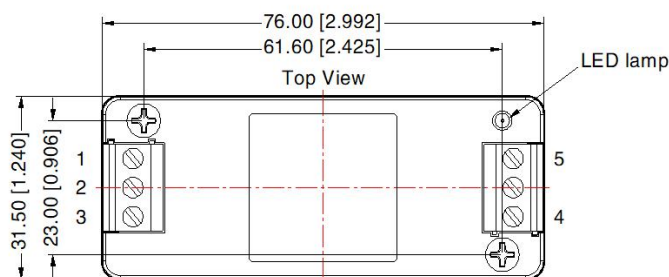


Pin-Out					
Pin	1	2	3	4	5
Mark	Ctrl	GND	Vin	+Vo	0V

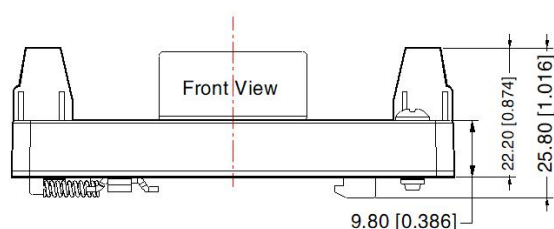
Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: $\pm 1.00 [\pm 0.039]$

URB24_YMD-10WR3GA4S Dimensions

THIRD ANGLE PROJECTION 



Pin-Out					
Pin	1	2	3	4	5
Mark	Ctrl	GND	Vin	+Vo	0V



Note:
Unit: mm[inch]
Mounting rail: TS35
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ± 1.00 [± 0.039]

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58210003 (DIP), 58200048 (with heat sink), 58220022(A2S/A4S package);
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^{\circ}\text{C}$, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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